Subject: Science Grade: Tenth - Earth Science

Standard: #9 Common Themes

Key Concept: The usefulness of a model can be tested by comparing its predictions to actual observations in the real world.

Generalization: The spacing and direction of contour lines on a topographic map indicate the shapes of landforms.

Background:

Students in an Earth Science class have begun to study models of the earth. They have covered latitude and longitude, earth's magnetic properties, the three common map projections (Mercator, gnomonic, and conic), and map reading. The topic of topographic maps has just been covered. Based on a quiz focusing on topographic maps and contour lines, the teacher has placed students in one of two groups for a lab activity.

This lesson is tiered in ***process*** according to ***readiness***.

Tier I:

These students need a more structured investigation to help them understand the concept of contour lines on topographic maps. One such investigation can be found on p. 54 of Modern Earth Science (1998, Holt, Rhinehart, and Winston). Students are directed to make a mountain 6-8 cm high out of clay, use a paper clip to make a valley on one side, and then place the mountain in a waterproof container. Students then add 1 cm of water, trace the outline, inscribing the clay with a shape pencil. Students successively add another centimeter of water and inscribe until the top of the model is reached. Students then remove the model and analyze the results. Any similar well-structured investigation would work for this group.

Tier II:

These students are given a more complex task to complete. The investigation on p. 58 of the above mentioned book is a good example. Students construct an island from the contour map of that island. The model is made using clay. Students compare their model to the contour map, analyzing particular landscape features and elevations.

Assessment:

Teacher observation and student interviews during the investigation will serve as formative assessments. Both groups will have a completed model that can be assessed for accuracy. Student answers to the analysis questions provided with each investigation should be shared with the class and discussed. The questions can be checked for thoroughness of answer, accuracy, and insight.